

___ 5. Write the statement "***a* is greater than or equal to 6**" as an inequality.

- a. $a < 6$
- b. $a \geq 6$
- c. $a > 6$
- d. $a \leq 6$
- e. $0 \leq a \leq 6$

___ 6. Evaluate the expression $||-10| - |-9||$. You may not use a calculator. Show all work.

- a. 19
- b. 1
- c. -1
- d. 0
- e. -19

___ 7. Find the distance between the numbers -8 and 6.

- a. -2
- b. 2
- c. 7
- d. 14
- e. -14

___ 8. Evaluate the expression. You may not use a calculator. Show all work.

$$\left(\frac{3}{4}\right)^{-3}$$

- a. $-\frac{27}{64}$
- b. $\frac{1}{27}$
- c. $\frac{64}{27}$
- d. $-\frac{64}{27}$
- e. $\frac{27}{64}$

___ 9. Evaluate the expression. You may not use a calculator. Show all work.

$$\sqrt[3]{150}\sqrt[3]{180}$$

- a. 90
- b. 11
- c. 60
- d. 30
- e. 15

___ 10. Simplify the expression. You may not use a calculator. Show all work.

$$\sqrt{72} + \sqrt{50}$$

- a. $9\sqrt{2}$
- b. $11\sqrt{2}$
- c. $12\sqrt{5}$
- d. $11\sqrt{5}$
- e. $12\sqrt{2}$

___ 11. Simplify the expression.

$$\left(9x^8y^4\right)\left(\frac{1}{3}x^4y^6\right)$$

- a. $3x^{32}y^{24}$
- b. $27x^{12}y^{10}$
- c. $3x^{24}y^{32}$
- d. $3x^{12}y^{10}$
- e. $3x^{10}y^{12}$

___ 12. Simplify the expression. Assume the letters denote any real numbers.

$$\sqrt[3]{x^3y^6}$$

- a. xy^2
- b. x^2y
- c. xy^5

- d. xy^3
- e. xy^4

___ 13. Simplify the expression. Assume the letters denote any real numbers.

$$\sqrt[7]{a^5b} \sqrt[7]{a^9b}$$

- a. $a^2\sqrt{7b^2}$
- b. $b^7\sqrt{a^2}$
- c. $a^2\sqrt[7]{b}$

- d. $a^2\sqrt{b^2}$
- e. $a^7\sqrt{b^2}$

___ 14. Use scientific notation, the Laws of Exponents, and a calculator to perform the operation.

$$(2.27 \times 10^{-15})(3.89 \times 10^{-21})$$

- a. 8.8303×10^{-36}
- b. 8.8303×10^{-35}
- c. 8.8303×10^{-6}

- d. 1.7137×10^6
- e. 0.5835×10^{-36}

___ 15. Perform the indicated operations and simplify.

$$(t+6)(t+7) - 2(t+8)$$

- a. $t^2 - 11t + 26$
- b. $t^2 + 11t - 26$
- c. $t^2 + 11t + 26$

- d. $t^2 - 11t - 26$
- e. $t^2 + 26t + 11$

___ 16. Perform the indicated operations and simplify.

$$(6-4y)^2$$

- a. $36 - 48y + 16y^2$
- b. $36 + 48y - 16y^2$
- c. $36 - 24y + 16y^2$

- d. $36 - 16y^2$
- e. $36 + 16y^2$

___ 17. Perform the indicated operations and simplify.

$$(1-3y)^3$$

- a. $-27y^3 + 27y^2 - 9y + 1$
- b. $27y^3 - 32y^2 + 9y - 4$
- c. $-27y^3 + 9y^2 - 27y + 1$

- d. $27y^3 - 27y^2 + 9y - 1$
- e. $1 - 27y^3$

___ 18. Perform the indicated operations and simplify.

$$(z+x+t)(z-x-t)$$

- a. $z^2 + x^2 - 2zt + t^2$
- b. $z^2 - x^2 + 2xt + t^2$
- c. $z^2 + x^2 + 2xt + t^2$

- d. $z^2 - x^2 - 2xt - t^2$
- e. $z^2 - x^2 - 2xz - t^2$

___ 19. Use a Factoring Formula to factor the expression.

$$36z^2 - 60z + 25$$

a. $(6z + 5)^2$

b. $(5z - 4)^2$

c. $(6z - 5)(6z + 5)$

d. $(5z - 4)(5z + 4)$

e. $(6z - 5)^2$

___ 20. Factor the expression by grouping terms.

$$3x^2 + x^2 - 18x - 6$$

a. $(x^2 - 6)(2x + 1)$

b. $(x^2 + 6)(2x - 1)$

c. $(x^2 - 7)(2x + 1)$

d. $(x^2 - 6)(3x + 1)$

e. $(x^2 - 7)(3x + 1)$

___ 21. Factor completely.

$$6x^6 + 24x^{10}$$

a. $x^6(1 + 4x^4)$

b. $6(x^6 + 4x^{10})$

c. $6x^6(1 + 4x^4)$

d. $6x^6(1 - 4x^4)$

e. $x^6(6 + 24x^4)$

___ 22. Factor the expression completely.

$$12x^2 - 7x - 12$$

a. $(7x + 5)(3x - 4)$

b. $(4x + 3)(5x - 7)$

c. $(7x + 5)(5x - 7)$

d. $(4x + 3)(3x - 4)$

e. $(4x - 3)(3x + 4)$

___ 23. Factor the expression completely.

$$r^2 - 10rs + 25s^2$$

a. $(r - 4s)(r + 4s)$

b. $(r + 4s)^2$

c. $(r - 5s)^2$

d. $(r - 4s)^2$

e. $(r - 5s)(r + 5s)$

___ 24. Find the domain of the expression.

$$-x^4 + x^3 + 7x$$

a. $\{x | x \neq 3\}$

b. $\{x | x \neq 7\}$

c. $\{x | x \neq 1\}$

d. all real numbers

e. $\{x | x \neq 5\}$

___ 25. An expression is given. Evaluate it at the given value.

$$-x^4 + x^3 + 8x, x = -1$$

a. -10

b. -9

c. 9

d. 10

e. -12

_____ 26. Rationalize the denominator. You may not use a calculator. Show all work.

$$\frac{4}{\sqrt{3} + 6}$$

a. $\frac{24 - 6\sqrt{3}}{13}$

b. $\frac{24 + 4\sqrt{3}}{33}$

c. $\frac{24 + 4\sqrt{3}}{39}$

d. $\frac{24 - 4\sqrt{3}}{33}$

e. $\frac{24 + 6\sqrt{3}}{19}$

_____ 27. Solve the equation.

$$\frac{z}{9} = \frac{6}{63}z + 7$$

a. -49

b. 7

c. 6

d. 63

e. 441

_____ 28. Solve the equation $P = 8l + 5w$ for l .

a. $l = \frac{P - 5w}{8}$

b. $l = \frac{P + 8w}{5}$

c. $l = -\frac{P + 5w}{8}$

d. $l = \frac{P - 8w}{5}$

e. $l = \frac{P + 5w}{8}$

_____ 29. Find all real solutions of the equation.

$$2x^2 + 7x - 4 = 0$$

a. none of these

b. $x = -\frac{1}{2}, x = 4$

c. $x = \frac{3}{2}, x = -1$

d. $x = \frac{1}{2}, x = -4$

e. $x = -\frac{1}{2}, x = -4$

_____ 30. Find all real solutions of the equation.

$$\theta^2 - \frac{8}{7}\theta + \frac{16}{49} = 0$$

a. none of these

b. $\theta = \frac{4}{7}$

c. $\theta = \frac{4}{7}, \theta = -\frac{4}{7}$

d. $\theta = -\frac{8}{7}$

e. $\theta = \frac{4}{7}, \theta = -\frac{8}{7}$

_____ 31. Use the discriminant to determine the number of real solutions of the equation.

$$x^2 - 5.46x + 3.8 = 0$$

Do not solve the equation.

a. two real solutions

b. exactly one real solution

c. more than two real solutions

d. none of these

e. no real solutions

___ 32. Find all real solutions of the equation.

$$\sqrt{4x + 16} + 4 = x$$

- a. 4, 0
- b. 0
- c. -12
- d. 0, 12
- e. 12

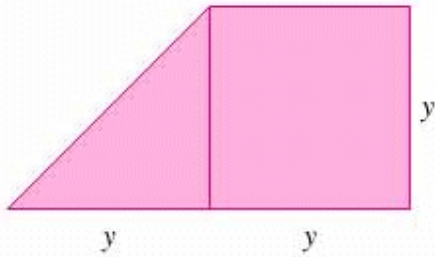
___ 33. An executive in an engineering firm earns a monthly salary plus a Christmas bonus of \$9,000. If she earns a total of \$103,800 per year, what is her monthly salary?

- a. \$8,650.00
- b. \$9,050.00
- c. \$94,800.00
- d. \$754.17
- e. \$7,900.00

___ 34. A father is four times as old as his daughter. In 5 years, he will be three times as old as she is. How old is the daughter now?

- a. 15 years old
- b. 4 years old
- c. 10 years old
- d. 5 years old
- e. 6 years old

___ 35. Find the length y in the figure, if the shaded area is 96 in^2 .



- a. 8 in.
- b. 9.80 in.
- c. 48.00 in.
- d. 11.31 in.
- e. 9 in.

___ 36. Find the slope of the line through $P(-1, -4)$ and $Q(-5, 4)$.

- a. $m = -1$
- b. $m = 4$
- c. $m = -2$
- d. $m = -7$
- e. $m = 1$

___ 37. Determine the correct equation for the line passing through the point $(3, 15)$ with a slope of 3.

- a. $y = -3x + 6$
- b. $y = 3x + 15$
- c. $y = -3x - 15$
- d. $y = 3x - 6$
- e. $y = 3x + 6$

- ___ 38. Determine the correct equation for the line passing through the point $(5, -4)$ and parallel to the line $x + 5y = 5$.
- $y = 5x - 3$
 - $y = -\frac{1}{5}x - 5$
 - $y = 5x + 3$
 - $y = \frac{1}{5}x + 3$
 - $y = -\frac{1}{5}x - 3$

- ___ 39. Write the equation for the line passing through the point $(1, 20)$ which is perpendicular to the line $y = 19$.
- $x = 0$
 - $y = -1$
 - $y = 3$
 - $x = 1$
 - $y = 2$

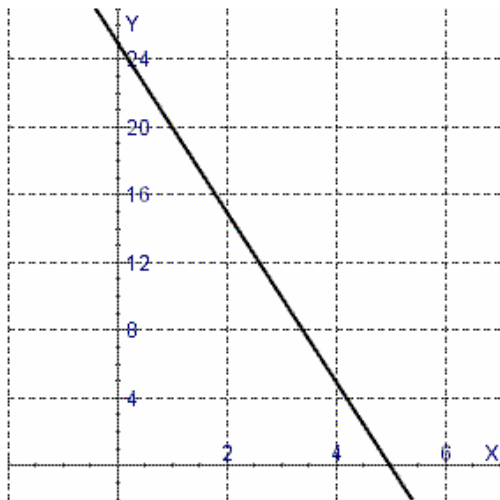
- ___ 40. The relationship between the Fahrenheit (F) and Celsius (C) temperature scales is given by the equation:

$$F = \frac{9}{5}C + 32.$$

Find the Celsius temperature corresponding to $F = 95^\circ$.

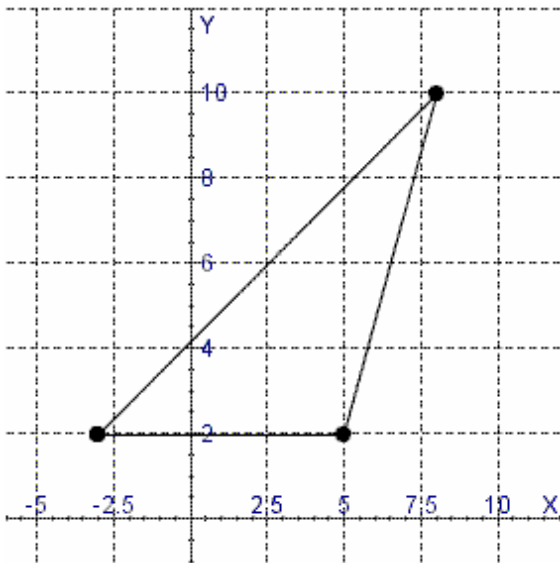
- $C = 36^\circ$
- $C = 37^\circ$
- $C = 34^\circ$
- $C = 35^\circ$
- $C = 33^\circ$

- ___ 41. Determine the slope of the line which is sketched below.



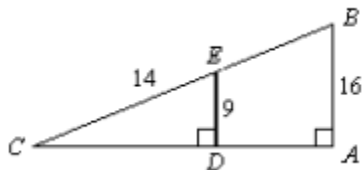
- $m = -5$
 - $m = 1$
 - $m = -4$
 - $m = -10$
 - $m = -2$
- ___ 42. If $\frac{a}{b} = \frac{c}{d}$, then _____.
- $\frac{a+b}{b} = \frac{c+b}{d}$
 - $ac = bd$
 - $\frac{a+b}{b} = \frac{c+d}{d}$
 - $\frac{a}{b} = \frac{a+c}{b+d}$

50. Find the area of the triangle shown in the figure. Round to the closest positive whole number.



- a. 30
- b. 34
- c. 35
- d. 32
- e. 29

51. Given that $\frac{ED}{BA} = \frac{EC}{BC}$, find BC to the nearest tenth. The figure is not drawn to scale.

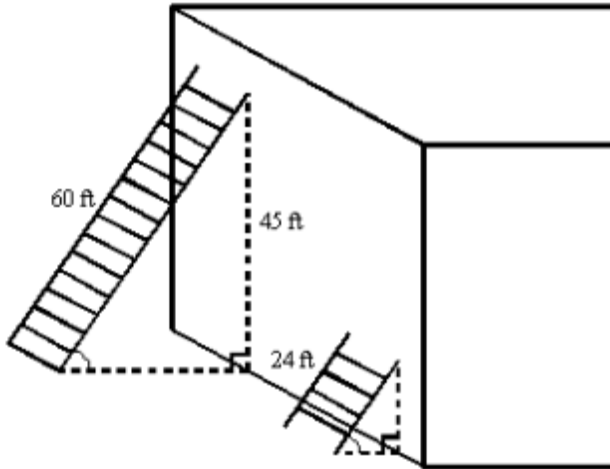


- a. 27.1
- b. 3.1
- c. 24.9
- d. 10.9

52. A map has a scale of $\frac{1}{2}$ inch : 28 miles. If the actual distance between the two cities is 448 miles, how far apart are they on the map?

- a. 16 inches
- b. 32 inches
- c. 8 inches
- d. 4 inches

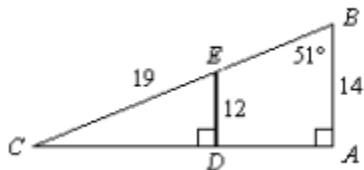
- ___ 53. Two ladders are leaning against a wall at the same angle as shown.



How far up the wall does the shorter ladder reach?

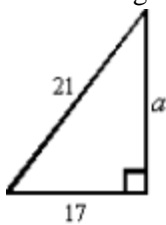
- a. 16 ft b. 18 ft c. 22 ft d. 36 ft

- ___ 54. Use the figure to find $m\angle CED$. The figure is not drawn to scale.



- a. 51° b. 52° c. 39° d. 37°

- ___ 55. Find the length of the leg of this right triangle. Give an approximation to 3 decimal places.

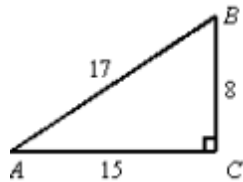


- a. 12.329 c. 12.650
b. 11.916 d. 27.019

- ___ 56. How long is a string reaching from the top of a 13-ft pole to a point on the ground that is 7 ft from the base of the pole?

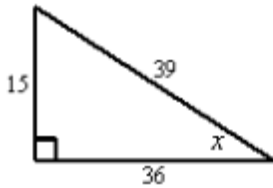
- a. $\sqrt{120}$ ft
b. $\sqrt{208}$ ft
c. $\sqrt{218}$ ft
d. $\sqrt{110}$ ft

___ 63. Write $\cos B$.



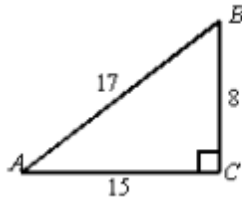
- a. $\frac{8}{17}$ b. $\frac{15}{17}$ c. $\frac{15}{8}$ d. $\frac{8}{15}$

___ 64. Use the diagram to find $\cos x$ as a fraction in simplest form.



- a. $\frac{12}{13}$ c. $\frac{5}{12}$
b. $2\frac{2}{5}$ d. $\frac{5}{13}$

___ 65. Find $\tan B$ for the right triangle below:



- a. $\frac{8}{17}$ b. $\frac{15}{17}$ c. $\frac{8}{15}$ d. $\frac{15}{8}$

___ 66. Use properties of real numbers to write the expression $9(z + y)$ without parentheses.

- a. $9(y + z)$ d. $9z + 9y$
b. $9zy$ e. none of these
c. $9z + y$

___ 67. Write the radical expression using exponents.

- $\frac{1}{\sqrt{13}}$
- a. 13^{-2} d. $13^{\frac{1}{2}}$
b. $13^{-\frac{1}{2}}$ e. $-13^{\frac{1}{2}}$
c. 13^2

68. Write the exponential expression using radicals.

$$a^{\frac{7}{8}}$$

a. $\sqrt[7]{a^8}$

b. $\sqrt[8]{a^7}$

c. $\frac{1}{\sqrt[8]{a^7}}$

d. $\frac{1}{\sqrt[7]{a^8}}$

e. $\sqrt[15]{a^7}$

69. Simplify the expression.

$$\frac{a^{-8}b^7}{a^{-6}b^4}$$

a. $\frac{a^3}{b^2}$

b. $\frac{b^3}{a^2}$

c. $\frac{b^3}{a^3}$

d. $a^{\frac{8}{6}}b^{\frac{7}{4}}$

e. $\frac{a^3}{b^3}$

70. Simplify the expression.

$$\left(3u^7v^9\right)\left(2u^5v^2\right)^{-2}$$

a. $\frac{81u^{18}v^{32}}{4}$

b. $\frac{4u^{18}v^{32}}{81}$

c. $\frac{81u^{19}v^{33}}{4}$

d. $\frac{4u^{19}v^{32}}{81}$

e. $\frac{1}{324u^{18}v^{32}}$

71. Write the number 0.06447 in scientific notation.

a. 6.447×10^{-2}

b. -6.447×10^2

c. 6.447×10^{-1}

d. 6.447×10^{-3}

e. 6.447×10^2

72. State whether the polynomial is a monomial, binomial, or trinomial, then list its terms and state its degree.

$$9x^7 + 6x^4$$

a. Binomial; $9x^7$, $6x^4$; 4;

b. Binomial; $9x^7$, $6x^4$; 7;

c. Binomial; $9x^7$, $6x^4$; 10;

d. Trinomial; $9x^7$, $6x^4$; 10;

e. Trinomial; $9x^7$, $6x^4$; 7;

73. Perform the indicated operations and simplify.

$$\left(2x^2 + x + 7\right) + \left(6x^2 - 7x - 4\right)$$

a. $-4x^2 - 6x + 3$

b. $9x^2 - 8x + 3$

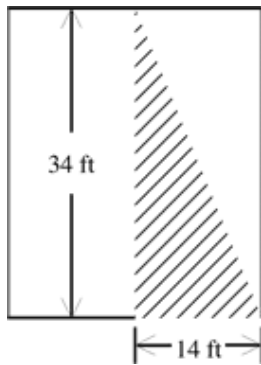
c. $9x^2 + 8x - 3$

d. $8x^2 - 6x + 3$

e. $8x^2 + 6x - 3$

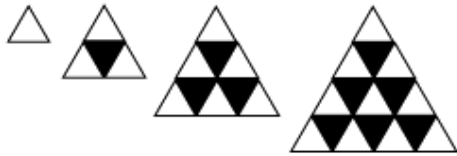
- _____ 74. Factor the trinomial.
 $x^2 - 8x + 15$
a. $(x - 4)(x - 5)$ d. $(x - 4)(x + 6)$
b. $(x - 4)(x - 6)$ e. $(x - 3)(x - 6)$
c. $(x - 3)(x - 5)$
- _____ 75. Factor completely.
 $3x^2 + 13x + 12$
a. $(4 - 3x)(3 + x)$ d. $(3x + 4)(3 - x)$
b. $(3x - 4)(3 + x)$ e. $(3x + 4)(x - 3)$
c. $(3x + 4)(3 + x)$
- _____ 76. Solve the equation.
 $-4w + 32 = -8w$
a. 8 d. -8
b. 32 e. -9
c. 9
- _____ 77. Craig is saving to buy a vacation home. He inherits some money from a wealthy uncle, then combines this with the \$24,000 he has already saved and doubles the total in a lucky investment. He ends up with \$140,000, just enough to buy a cabin on the lake. How much did he inherit?
a. \$46,000 d. \$47,000
b. \$43,000 e. \$92,000
c. \$45,000
- _____ 78. Convert 6 yards to inches.
a. 72 in.
b. 216 in.
c. 75 in.
d. 18 in.
- _____ 79. The literature club is printing a storybook to raise money. The print shop charges \$3 for each book, and \$45 to create the film. How many books can the club print if their budget is \$525?
a. 165
b. 170
c. 175
d. 160

80. Sandy has to figure out the square footage of the shaded portion of the wall below in order to calculate the amount of paint needed to repaint it.



What is the area of the shaded portion?

- a. 476 square feet
b. 238 square feet
c. 952 square feet
d. 119 square feet
81. If the pattern is continued, how many white triangles will be in Figure 7?



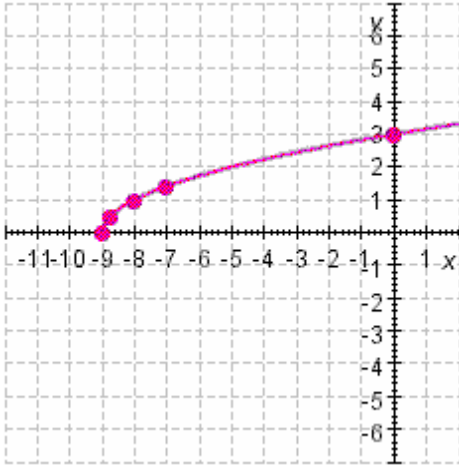
- a. 26
b. 36
c. 35
d. 28
82. Solve: $x - 3 \leq 5$ or $x + 4 \geq 14$
- a. $x \leq 8$
b. $x \leq 8$ or $x \geq 10$
c. $x \geq 10$
d. $8 \leq x \leq 10$

83. Solve: $|x + 6| = 6$
- a. -12
b. 12, 0
c. 0, -12
d. 0

84. Make a table of values and sketch the graph of the equation. Find the x - and y -intercepts.

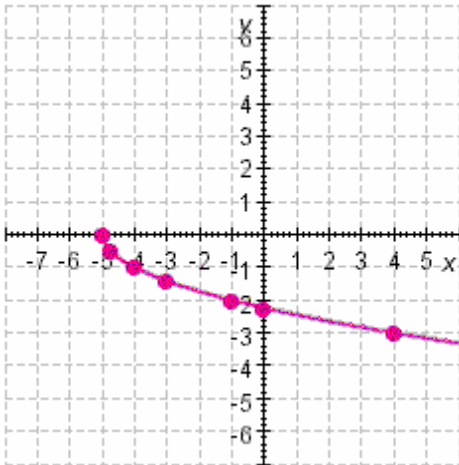
$$y = \sqrt{x+9}$$

a.



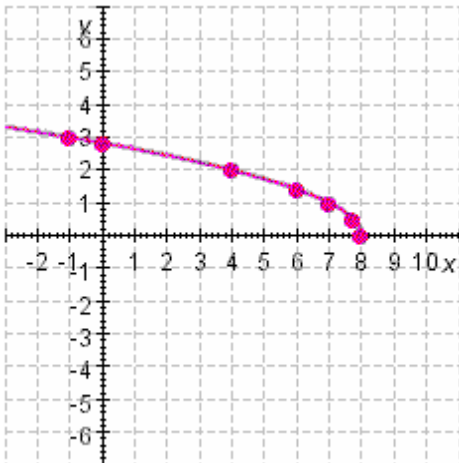
x -intercept is -9 , y -intercept is 3

b.



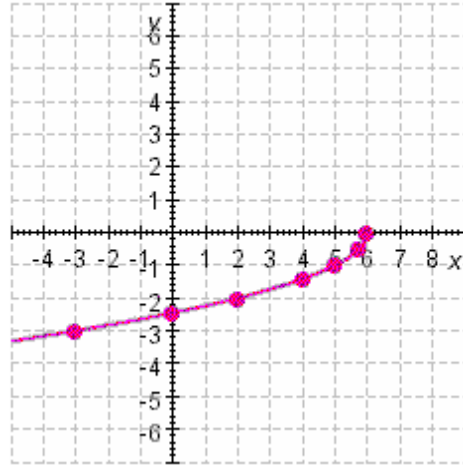
x -intercept is -5 , y -intercept is 3

c.



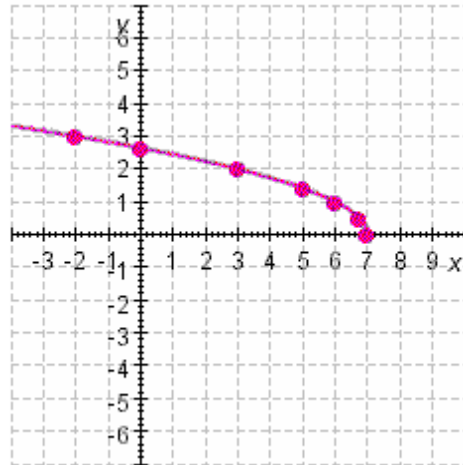
x -intercept is -9 , y -intercept is 3

d.



x -intercept is -9 , y -intercept is 3

e.

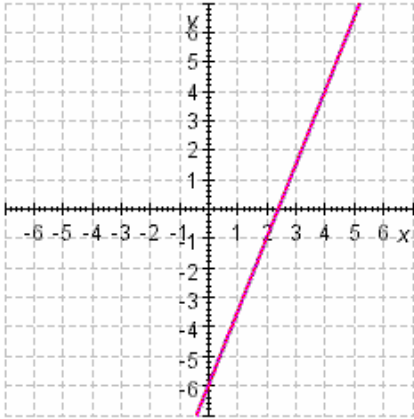


x -intercept is -9 , y -intercept is 3

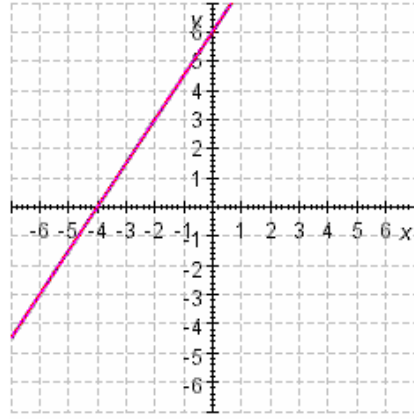
85. Find the slope and y-intercept of the line and draw its graph.

$$3x - 2y = 12$$

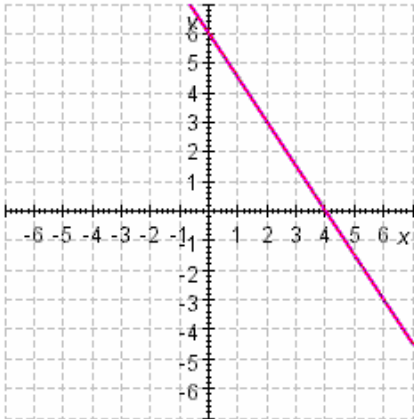
a. The slope is $\frac{5}{2}$ and the y-intercept is -6 .



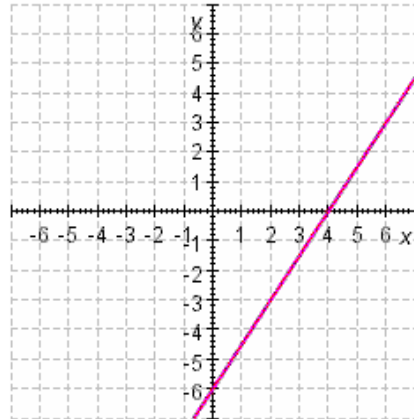
d. The slope is $\frac{3}{2}$, and the y-intercept is 6.



b. The slope is $-\frac{3}{2}$, and the y-intercept is 6.



e. The slope is $\frac{3}{2}$, and the y-intercept is -6 .



c. The slope is $-\frac{3}{2}$, and the y-intercept is -6 .

